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Paper No. 21

UNITED STATES PATENT AND TRADEMARK OFFICE

**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Ex parte HARUNOBU KUSUMOTO

Appeal No. 2001-2533
Application No. 09/372,988

ON BRIEF

Before ABRAMS, STAAB, and NASE, Administrative Patent Judges.
ABRAMS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1-4.¹
Claims 6-8 have been allowed and claims 5 and 9 have been canceled.

We AFFIRM-IN-PART.

¹Claim 2 was amended after the final rejection.

BACKGROUND

The appellant's invention relates to a tubular body. An understanding of the invention can be derived from a reading of exemplary claim 1, which has been reproduced below.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Qureshi <u>et al.</u> (Qureshi)	4,567,216	Jan. 28, 1986
Fenton <u>et al.</u> (Fenton)	5,093,162	Mar. 3, 1992
Akatsuka <u>et al.</u> (Akatsuka)	5,156,396	Oct. 20, 1992
Okada	5,968,621	Oct. 19, 1999

The following rejections stand under 35 U.S.C. § 103(a):

- (1) Claim 1 on the basis of Akatsuka in view of Fenton.
- (2) Claim 2 on the basis of Akatsuka in view of Qureshi.
- (3) Claim 3 on the basis of Akatsuka in view of Okada.
- (4) Claim 4 on the basis of Akatsuka.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellant regarding the above-noted rejections, we make reference to the Answer (Paper No. 16) for the examiner's complete reasoning in support of the rejections, and to the Brief (Paper No. 15) for the appellant's arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellant's specification and claims, to the applied prior art references, and to the respective positions articulated by the appellant and the examiner. As a consequence of our review, we make the determinations which follow.

The appellant's invention relates to improvements in tubular bodies for items such as golf club shafts and fishing rods which are constructed of body layers formed of fibers and resin. According to the appellant, in such items, where bending stress, torsional stress and impact force are applied, separation of layers and damage tend to occur in portions where parts are attached to the shaft. The invention overcomes these problems by utilizing layers of fibers impregnated in resin wherein the "ratio² of impregnation of synthetic fiber" in each layer have particular values and relationships to one another, and wherein there is a relationship between the modulus of elasticity of certain layers.

Claim 1

A tubular body comprising: rolled layers of prepeg formed of reinforcing fibers impregnated with synthetic resin, wherein a ratio of impregnation of synthetic resin contained in a skew fiber body on which fibers are arranged on a skew direction and a ratio of impregnation of synthetic resin contained in an axial fiber body layer on which fibers are arranged in an axial direction, are each in a range from a value within a

²As we understand the appellant's invention, "ratio" should be interpreted to mean the percent of resin that is present in the layer of prepeg.

range between 10% wt to 25% wt, and a thin layer, the ratio of impregnation of synthetic resin of which is greater than 28% by weight, is provided between the skew fiber body layer and the axial fiber body layer, the skew fiber body layer, the axial fiber body layer and the thin layer are rolled over substantially the whole length of the tubular body, and

a ratio of impregnation of synthetic resin each on the skew fiber body layer and the axial fiber body layer is lower than that of impregnation of synthetic resin on the thin layer.

(1)

Claim 1 stands rejected under Section 103 as being obvious in view of the combined teachings of Akatsuka and Fenton.³ It is the examiner's position that Akatsuka discloses all of the subject matter except for a thin layer having a ratio greater than 28% by weight, but that this would have been obvious because "[c]learly an artisan . . . would have selected a suitable impregnation of resin for a thin layer . . . of greater than 28% by weight," for "[i]n view of the patent to Fenton it would have been obvious . . . in order to have less fibers and a more flexible shaft" (Answer, pages 4 and 5). The appellant argues in opposition to this conclusion that Akatsuka fails to disclose a ratio

³The test for obviousness is what the combined teachings of the prior art would have suggested to one of ordinary skill in the art. See, for example, In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). In establishing a prima facie case of obviousness, it is incumbent upon the examiner to provide a reason why one of ordinary skill in the art would have been led to modify a prior art reference or to combine reference teachings to arrive at the claimed invention. See Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Int. 1985). To this end, the requisite motivation must stem from some teaching, suggestion or inference in the prior art as a whole or from the knowledge generally available to one of ordinary skill in the art and not from the appellant's disclosure. See, for example, Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1052, 5 USPQ2d 1434, 1439 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988).

greater than 28% and fails to disclose layers of varying rates of resin impregnation, that while Fenton discloses ratios of up to 34% it fails to teach that the ratio of the middle layer should be greater than that of the other layers, and that no suggestion exists to modify the Akatsuka tubular body in such a manner as to meet the terms of the claim. We find ourselves in agreement with the appellant, and we will not sustain the rejection.

Akatsuka is directed to a tubular golf club shaft. The shaft disclosed has three layers of reinforcing fibers impregnated with resin which extend along the entire length of the shaft, with fourth layers being added at the tip and grip ends of the shaft (columns 2 and 3). The fibers in inner layer 1 are skewed (column 2, lines 27-28). Those of intermediate layer 2 and outer layer 3 can be axially oriented (column 2, lines 17-18 and the drawing). Inner layer 1, intermediate layer 2 and outer layer 3 all have a fiber content of at least 73% by weight and preferably 75-77% by weight which, considering the resin to comprise the remaining ingredient, constitutes resin content of 23-27% by weight (column 2, line 51 to column 3, line 31). The fourth layers 4, which are located inward of inner layer 1, contain 24-37% resin by weight, but are not between any two of the other layers, and therefore are of no consequence in evaluating the patentability of claim 1.

With regard to the requirements of claim 1, while the ranges taught by Akatsuka would enable inner and outer layers having resin contents of 23% by weight, which falls within the claimed range of 10-25% by weight, they peak at 27% by weight, which falls

short of the requirement for the intermediate layer of the claim, which is greater than 28%. Moreover, Akatsuka does not teach that the resin content of any of the inner, intermediate and outer layers should differ from one another, much less that the intermediate layer have a greater resin content than the inner and outer layers.

In the golf club handle of Fenton both the standard and the high strength prepegs that are used for the various layers are disclosed as utilizing 34% resin content, and there is no teaching that this can be different for any particular layer. Thus, on its face, Fenton would not have suggested to one of ordinary skill in the art that the Akatsuka shaft be modified in such a fashion as to meet the terms of claim 1. The examiner's conclusion that an artisan would have seen fit to use more than 28% resin in the intermediate layer "in order to have less fibers and a more flexible shaft" (Answer, page 5) is not supported by evidence and therefore must be considered to be merely an opinion, which can be accorded no weight. Therefore, from our perspective, suggestion to modify Akatsuka in the manner proposed by the examiner is grounded in the hindsight afforded one who first viewed the appellant's disclosure. This, of course, is not a proper basis for a rejection under Section 103. In re Fritch, 972 F.2d 1260, 1264, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992).

It thus is our conclusion that the evidence adduced by the examiner fails to establish a prima facie case of obviousness with regard to the subject matter recited in claim 1, and we will not sustain the rejection.

(2)

The invention set forth in claim 2 comprises a skew fiber body layer having a resin ratio of 15-20% by weight and an axial fiber body layer having a resin content of 10-15% by weight, with that of the axial layer being lower than that of the skewed layer. This claim has been rejected on the basis of Akatsuka and Qureshi. Akatsuka has been discussed above; it teaches that all full layers should have resin contents of 23-27% and therefore does not suggest the ranges recited in claim 2. Qureshi teaches resin percentages in the range of 5-70 by weight (column 11, lines 39-45), and the examiner looks to this for alleviating the shortcoming in Akatsuka, opining that it would have been obvious to make the resin content of the axial layer lower than that of the skew layer, and both within the claimed ranges, "in order to have more fibers and less resin for the same total weight of a layer such that the shaft will be stiffer for a player who requires a stiffer shaft" (Answer, pages 5 and 6). No evidentiary basis is presented in support of this conclusion, and therefore we will not sustain the rejection on the basis that a prima facie case of obviousness has not been established.

(3)

Claim 3 sets forth the invention as comprising a body layer having a ratio of impregnation of synthetic resin in a range of 10-25% by weight, a partial layer having a resin ratio which is greater than 28%, with the body layer having a lower ratio than the

partial layer, and wherein the modulus of elasticity of fibers composing the partial layer is lower than that of the fibers composing the body layer.

We agree with the examiner that some of the ratios in the range of 23-27% disclosed in Akatsuka for all three of the full length (body) layers fall with the scope of 10-25% required by this claim, and that some of Akatsuka's ratios in the range of 24-34% for the partial (reinforcing) layer are greater than the 28% required. In addition, we agree that the teachings of Akatsuka would have suggested to one of ordinary skill in the art that the ratio of the body layer be lower than that of the partial layer, for considering the ranges of 14-37% and 23-28% that are taught by Akatsuka, many combinations would meet this limitation.

With regard to the modulus of elasticity, Akatsuka discloses that the body fibers of the various body layers are 23,000-65,000 kg/mm² (column 2, lines 39-40), 35,000 kg/mm² "or more" (column 2, line 65), and 23,000-30,000 kg/mm² (column 3, line 17). The partial (reinforcing) fibers are described as being "[t]he high strength fibers exemplified above" (column 3, line 60), which are 23,000-65,000 kg/mm² (column 2, lines 38-40). In addition to these ranges, however, a relationship between the moduli of the two groups of fibers is taught in Example 1, in which body layer A-1 is 40,000 kg/mm² and the partial layers at the tip (Rt) and the grip (Rg) are 23,500 kg/mm² (column 5, line 48 et seq.). As is shown by Table 1, all of the layers used for forming the intermediate and outer body layers have a modulus greater than that of the partial

layer. The same is true for all but one of the body sheets in Example 2, and that one is equal to the modulus of the partial layer (column 8, line 62 et seq.). It is our view that these teachings would have suggested to one of ordinary skill in the art that the modulus of elasticity of the partial layer be lower than that of the body layer.

We view Okada merely to be confirmatory of the fact that it was known in the art at the time of the appellant's invention to alter the modulus of elasticity of the layers in order to alter the flexural rigidity, which is recognized in the opening paragraphs of Akatsuka.

We therefore conclude that the applied references establish a prima facie case of obviousness with regard to the subject matter recited in claim 3, and we will sustain the rejection.

In arriving at this conclusion, we have carefully considered the arguments presented on pages 9 and 10 of the Brief, but they have not persuaded us that the decision made by the examiner was in error. In particular, as we explained above, the applied prior art does disclose a partial layer having a modulus of elasticity lower than that of the body layer.

(4)

Claim 4 stands rejected as being unpatentable over Akatsuka. This claim recites a skew fiber body layer and a circumferential layer and establishes for them the same ratios of impregnation of resins that were applied to the skew fiber layer and the thin

layer of claim 1. On the basis of the same reasoning we set forth with regard to claim 1, we also will not sustain the rejection of claim 4.

SUMMARY

The rejections of claims 1, 2 and 4 are not sustained.

The rejection of claim 3 is sustained.

The decision of the examiner is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

NEAL E. ABRAMS
Administrative Patent Judge

LAWRENCE J. STAAB
Administrative Patent Judge

JEFFREY V. NASE
Administrative Patent Judge

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RETURN TO LESLEY

APPEAL NO. 2001-2533 - JUDGE ABRAMS
APPLICATION NO. 09/372,988

APJ ABRAMS

APJ STAAB

APJ NASE

DECISION: **AFFIRMED-IN-PART**

Prepared By: LESLEY BROOKS

GAU: 3700

DRAFT TYPED: 20 Jun 03

FINAL TYPED: